Remarks/Arguments:

Claims 1, 2, 4-15, and 18-30 are pending. All pending claims are rejected.

The present invention is directed towards a display including electroluminescence (EL) elements disposed between a plurality of cathode wires and anode wires. An anode control circuit is connected between the anode wires and a current source for discharging stored charge in the EL elements and controlling current flow into the anode wires. A cathode control circuit is connected between the cathode wires and a voltage source for discharging stored charge from the EL elements and controlling voltage at the cathode wires. A display controller controls the anode control circuit and the cathode control circuit to set a discharge time for discharging the EL elements before light emission of the EL elements to improve luminance characteristics of the display device.

Claims 1, 2, 4-15, and 18-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,978,403 to Iwasa et al. (herein Iwasa) in view of U.S. Patent No. 6,333,599 to Kawanami et al. (herein Kawanami) and U.S. Patent No. 5,600,343 to Sarrasin (herein Sarrasin). It is respectfully submitted, however, that the claims are patentable over the art of record for the reasons set forth below.

Iwasa discloses a display device having a two dimensional array including elements arranged in two dimensions in an elongated region that is longer in the horizontal direction than in the vertical direction. The device array includes N elements arranged in the horizontal direction and M elements arranged in the vertical direction, where N is greater than M. Wiring to the anodes and/or cathodes is inclined in the horizontal direction such that long wiring distances are minimized, thereby minimizing wiring resistance and electrostatic capacitance.

Sarrasin discloses a multiplexed matrix display screen. The display screen has N row electrodes and M column electrodes which cross one another, and N control circuits for successively controlling the N row electrodes. The control circuit for a row electrode includes means for applying a selection voltage during a selection time of a row electrode and then a discharge potential during at least part of a selection time of at least one other row electrode.

Kawanami relates to a plasma display panel including base plates forming plasma cells therebetween. The plasma cells illuminate when a current passes through the plasma cell. Kawanami discloses a plasma display panel having an electrode that offers improvements in efficiency of luminescence and sustained discharge current.

Applicant's invention, as recited in claim 1, includes features neither disclosed nor suggested by the art of record, namely:

> an anode control circuit connected between said anode wires and said current source, for discharging said stored charge from said EL elements, and for controlling respective current flow into said anode wires,
>
> a cathode control circuit connected between said cathode wires and said voltage source, for discharging said stored charge from said EL elements, and for controlling respective voltages at said cathode wires,
>
> **a display controller for controlling said anode control circuit and said cathode control circuit, said display controller including a setting unit for setting a discharge time for discharging said stored charge of said EL elements before light emission of said EL elements to a time Rt,**
>
> **wherein a discharge time Tx for discharging said stored charge before light emission of said EL elements is determined so as to obtain a luminance Lp of said EL elements determined by:**
>
> **$Lp \geq 0.9 \times Le$,**
>
> **where Le is a luminance of light emitted by said EL elements storing substantially no electrical charge, and said discharge time Rt satisfies the relation of:**
>
> **$Tx \leq Rt$.**

This means that the EL elements are discharged during a set discharge time prior to driving them to emit light, which results in improved luminance. Additionally, the discharge time is set such that light is not emitted from the EL elements until a sufficient discharge time has passed to allow the EL elements, when driven, to obtain a luminance of at least 90% or greater than the luminance achievable when no electric charge is stored in the EL elements. This feature is found in the originally filed application at page 7, line 2 through page 8, line 2.

The art of record is devoid of any teaching or suggestion of control circuits for controlling the discharge time of an EL element prior to emitting light from the EL elements where the discharge time is set such that the EL elements are allowed to discharge for a period of time needed to obtain a luminance of 90% or greater than the luminance obtained with no stored charge in the EL elements. As set forth in the Office Action, Iwasa does not teach a mechanism for discharging the stored charge from EL elements. The Office Action thus relies on Sarrasin to teach discharging of the EL elements and Kawanami to teach setting a discharge time for discharging stored charge of EL elements before light emission.

The Office Action recites states that Kawanami teaches "the measured time variation of the discharge current and manipulation of discharge time TD in terms of minimum and maximum discharge currents as shown in Figure 7(A)" of Kawanami. The Office Action further recites that Kawanami "discloses improving the efficiency of luminescence by making a time at which the maximum discharge current to appear close to the time at which the maximum efficiency of luminance appears," referencing column 8, lines 33-52 and figures 7(A) and 7(B). Kawanami, however, does not disclose, teach, or suggest setting a discharge time for discharging stored charge of an EL element before emitting light from the EL elements, let alone setting the discharge time such that the EL elements are allowed to discharge for a period of time needed to obtain a luminance of 90% or greater than the luminance obtained with no stored charge in the EL elements, as set forth in claim 1, for at least two reasons.

First, Kawanami does not disclose, teach, or suggest **discharging stored charge of EL elements**. The discharge current described in Kawanami is **a sustained current passing through a plasma cell to illuminate the plasma cell**. See column 8, lines 33-36 of Kawanami. It is well known by those of skill in the art of plasma display devices that this sustained discharge is a continuous current **generated by an external power supply**, rather than **discharging stored charge of EL elements**. Thus, the discharge current in Kawanami does not disclose, teach, or suggest discharging stored charge of the EL elements as in claim 1.

Second, Kawanami does not disclose, teach, or suggest discharging current **before** emitting light from the EL elements. The discharge current in Kawanami causes the plasma elements to illuminate and, thus, occurs **during** the emission of light from the EL elements. This is readily apparent from Figures 7A and 7B. Figure 7A is a graph depicting discharge

current versus time for a discharge time period, Td. Figure 7B is a graph depicting illumination efficency during the discharge time, Td. The graphs each include a first plot, I (corresponding to a plasma electrode having a first shape), and a second plot, II (corresponding to a plasma electrode having a second shape), for comparing the performance of the electrode shapes. As depicted in these graphs, the plasma elements are illuminated with varying efficency during the entire discharge period, i.e., from 0 to Td, with efficiency peaking midway through the discharge period. Hence, it is clear that the discharge current in Kawanami occurs **during** light emission of the plasma elements, rather than **before** light emission. Thus, Kawanami does not disclose, teach, or suggest discharging current before light emission of EL elements as in claim 1.

Accordingly, since the discharge current in Kawanami does not discharge stored charge of EL elements and does not cause the discharge to occur before the light emission of the EL elements, Kawanami does not disclose, teach, or suggest setting a discharge time for discharging stored charge of EL elements before light emission of the EL elements to achieve a luminescence of 90% or greater than the luminescence achieved from EL elements having no charge as set forth in claim 1. Further, none of the art of record teach this particular feature.

It is because Applicants include the feature of controlling a discharge time for discharging stored charge in an EL element before light emission of the EL element to achieve a luminance of 90% or greater than the luminance achieved from an EL element having no charge that the following advantages are achieved. By properly setting the discharge time, Rt, the electric charge accumulated in the EL element can be removed effectively. As a result, the driving efficiency is improved. Further, the conventional defect of an apparent lowering of the display luminance is also improved. Further still, the display device is higher in driving speed, superior in reliability, lower in price, and smaller in size (see page 7, line 21 -page 8, line 2).

Accordingly, for the reasons set forth above, claim 1 is patentable over the art of record.

Independent claims 5, 18, and 21 include features similar to those discussed above with reference to claim 1. Accordingly, claims 5, 18, and 21 are also patentable over the art of record for the reasons set forth above. Claims 2, 4, 6-15, 19, 20, and 22-30 include all the features of either claims 1, 5, 18, or 21 from which they depend, either directly or indirectly.

Thus, claims 2, 4, 6-15, 19, 20, and 22-30 are also patentable over the art of record for the reasons set forth above.

In view of the arguments set forth above, the above identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

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